Adapting to Rising Tides

CONTRA COSTA COUNTY

Climate Impacts & Scenarios

Impacts

More frequent flooding of existing flood-prone areas resulting in more frequent disruption of power, access to goods, services and jobs, and strain on regional and local disaster response and recovery resources.

More extensive, longer-duration flooding that damages communities and infrastructure currently not in flood-prone areas, lengthens disruptions, and increases the demands on disaster response and recovery resources.

Shoreline erosion & overtopping of shoreline protection during storm events that flood inland areas, including communities and infrastructure that are currently protected.

Permanent inundation of areas not currently exposed, resulting in the need to either protect or move people and infrastructure, and the loss of trails, beaches, vistas, and other shoreline recreation areas.

Elevated groundwater & increased salinity intrusion can damage below or at-grade assets, increase liquefaction susceptibility, and require pumping that increases operations and maintenance costs.

Time Frame	Sea Level Rise	Total water level above today's daily high tide, MHHW (inches NAVD88), by tide recurrence interval							
		MHHW (≈ daily high tide)	1-yr (≈ King Tide)	2-yr	5-yr	10-yr	25-yr	50-yr	100-yr (1% annual chance)
Today		0	12	19	23	27	32	36	41
	+6	6	18	25	29	33	38	42	47
Likely Mid-Century	+12	12	24	31	35	39	44		53
	+18	18		37	41	45	50	54	59
	+24	24	36	43	47	51	56	60	65
	+30	30	42	49	53	57	62	66	71
Likely End-Century	+36	36	48	55	59	63	68	72	77
	+42	42	54	61	65	69	74	78	83
	+48	48	60	67	71	75	80	84	89
	+54	54	66	73	77	81	86	90	95
	+60	60	72	79	83	87	92	96	101

Scenarios

Climate scenarios are needed to understand how and when assets may be affected by sea level rise and storm events, how far reaching the consequences may be, and what actions should be taken.

To understand these factors it is helpful to evaluate a **range of possible futures**. The **"total water level"** approach eliminates the often challenging step of scenario selection and reduces the number of maps needed because each map represents different unique combinations of sea level rise and extreme tide (storm surge) conditions.

Refined Shoreline Mapping and Analysis

A series of 10 refined sea level rise maps will be created for the Contra Costa ART project. These maps will:

- Include MHHW, plus water levels from 1 to 9 ft above MHHW
- Be based on locally validated and adjusted shoreline topographic data
- Use updated water levels leveraging FEMA's SF Bay Study
- Leverage the in-progress shoreline and flood infrastructure mapping project (SFEI/AECOM)

Infrastructure and Utilities

Assets

Water Management

- ➢ Water supply systems
- ➢ Wastewater, e.g. collection, treatment & recycling facilities
- ➢ Flood management, e.g. tidal creeks and channels
- O Stormwater infrastructure

Ground Transportation

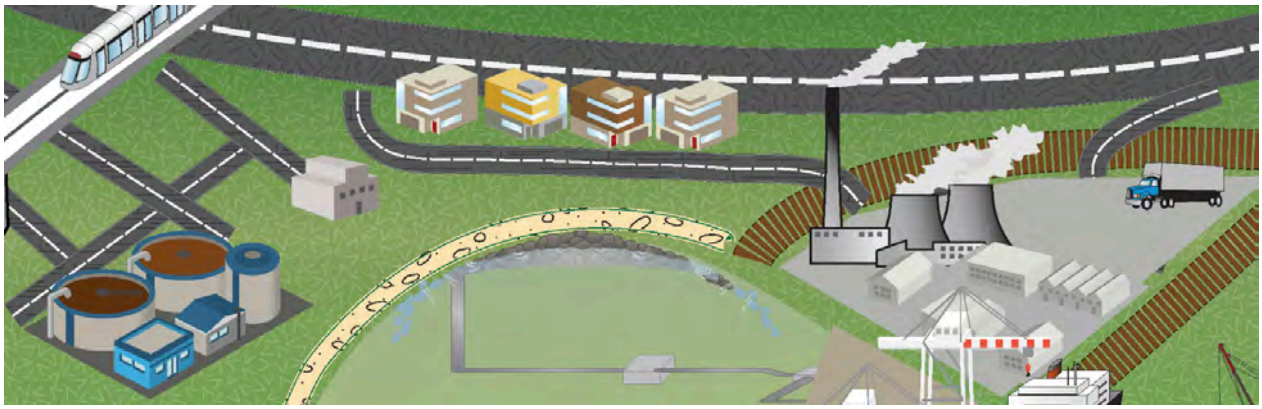
- ➢ Passenger & freight rail
- O Transit service
- O Local, state and interstate road network
- ➢ Bay Trail

Energy and Fuel supply

- ➢ Refineries, petroleum products and sulfur regeneration
- ➢ Crockett Co-generation Plant
- ➢ Power Distribution, e.g., substations
- O Pipelines, e.g., gas, petroleum, jet fuel, hazardous liquids

Quick Facts

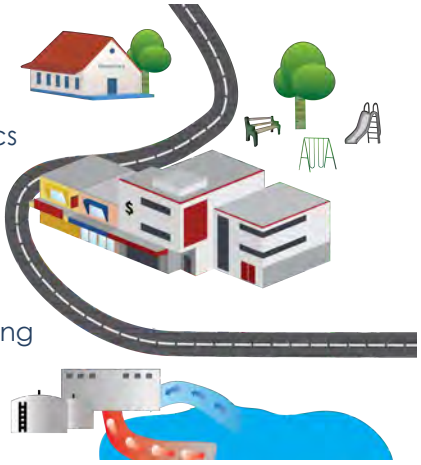
- ✧ Wastewater services in the project area are managed by nine different agencies. Some are projecting an increase in population and service demand. Capital investments in these systems to accommodate growing demand present opportunities to improve resilience to sea level rise and storm events.
- ✧ I-80, I-580, I-680 and San Pablo Avenue are located in areas that could flood as sea level rises. Even elevated portions of roadway could be at risk if exposure to saltwater corrodes the reinforcing concrete structures that support these segments.
- ✧ Large segments of the rail line are located along the shoreline with either ad-hoc, or no, flood and erosion protection. Both the Capitol Corridor inter-city passenger rail service and cargo rely on this rail line, and there are no alternative alignments from San Jose to Sacramento.



- ➢ Asset specific approach
- O Representative asset approach

Community Services

Assets



Community Characteristics

- O Individual, household, and neighborhood demographics

Residential Housing

- O Single-family
- O Multi-family
- O Senior and dependent housing
- O Other housing

Community Facilities & Services

- O Public health infrastructure, e.g., hospitals, clinics, skilled nursing facilities
- O Emergency facilities & services, e.g., fire and police stations
- O Community facilities, e.g., schools, child care centers, food banks, senior centers, animal shelters, services and facilities
- O Commercial, e.g., small grocery stores, financial buildings
- ➢ Household hazardous waste collection sites
- ➢ Waste transfer stations

Ground Transportation

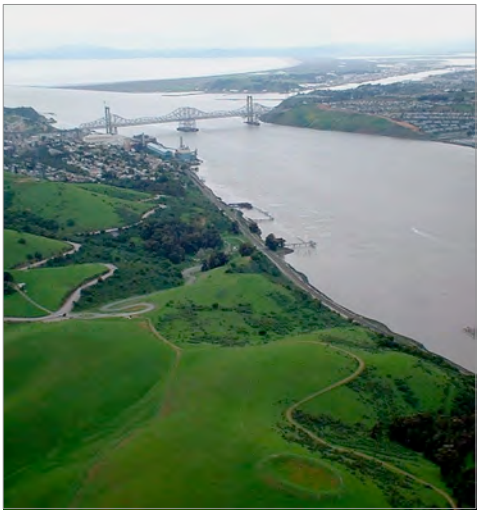
- ➢ Passenger rail
- O Local streets & roads
- O Bus routes
- O Bike & pedestrian trails

Energy & Fuel supply

- ➢ Power distribution, e.g., substations

Parks & Recreation Facilities

- ➢ Regional shoreline parks
- ➢ City parks
- ➢ Bay Trail & Water Trail
- O Marinas
- O Fishing piers



➢ Asset specific approach
O Representative asset approach

Quick Facts

- ✧ Hospitals and medical facilities in the project area are not in flood hazard zones. However, people who rely on these services may be unable to reach the facilities due to flooded neighborhoods and transportation routes.
- ✧ Regional shoreline parks provide recreation to more than three million Contra Costa residents and visitors per year. As sea level rises, the shoreline trails, playing fields and natural areas that these visitors enjoy may be damaged for long periods, or lost all together.
- ✧ Based on findings from the ABAG/BCDC study "Stronger Housing, Safer Communities," housing is difficult to protect from flooding, but critical to the recovery of a community.

Industrial Clusters & Campuses

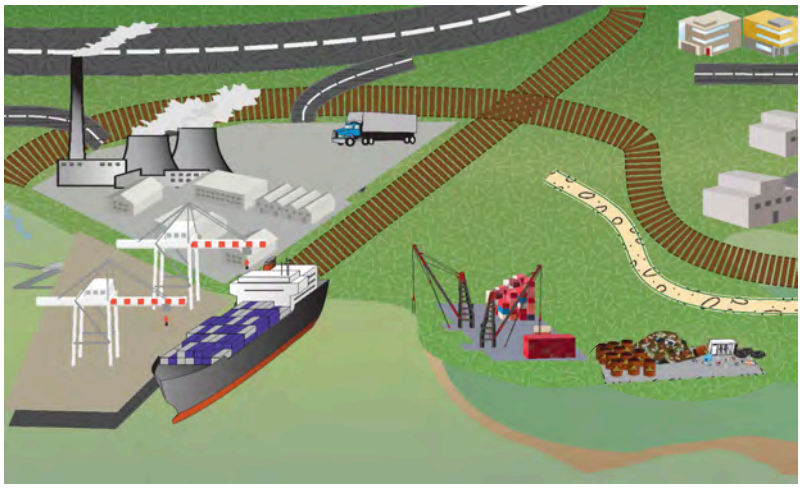
Assets

Industry

- O Land uses designated as industrial, e.g., manufacturing facilities, heavy and light industrial, research and development, flex space
- O Hazardous materials sites that generate, treat, or transport hazardous materials (representative assets: CalARP sites)

Contaminated Lands

- O Eight types of contaminated sites (representative assets: certain brownfield sites)
- ➢ Closed and active landfills, e.g., West Contra Costa Sanitary, Acme Fill Corporation, Vine Hill Complex



Water Management

- ➢ Water supply systems
- ➢ Wastewater, e.g. collection, treatment and recycling facilities

Goods Movement

- ➢ Freight rail, e.g., UPRR, BNSF and Richmond Rail
- O Local, state and interstate road network
- ➢ Port of Richmond
- ➢ Marine Oil Terminals

Energy & Fuel supply

- ➢ Crockett Co-generation Plant
- ➢ Power distribution, e.g., substations

➢ Asset specific approach
O Representative asset approach

Quick Facts

- ✧ Industrial land uses rely on services provided by others, including roads, rail, power, pipelines and communication systems.
- ✧ There are more than 2,000 contaminated sites in the county; approximately 130 of these may be at risk from sea level rise.
- ✧ The Port of Richmond leads the region in liquid bulk and automobile tonnage. The Port relies on both water and land side access. If roads and rail lines are disrupted by flooding, operations at the port will be affected, resulting in regional economic losses.